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NEW GENERA AND SPECIES OF GASTROPODA FROM THE UPPER
CRETACEOUS.¹

BY BRUCE WADE.

The extent of the Gastropod fauna discovered in the Upper Cretaceous of Tennessee and the remarkable state of preservation of the hitherto unknown generic types warrant the present preliminary account of some of the more interesting.

The locality is on Coon Creek, in the northeastern part of McNairy County, in west-central Tennessee, and a somewhat detailed account has been published recently in the Johns Hopkins Circular. The horizon is in the lower part of the Ripley formation and hence somewhat older than the classic Owl Creek fauna of the Ripley of Tippah County, Mississippi.²

Family **CANCELLARIIDÆ**.

Genus **MATAXA** gen. nov.

Etymology: *μάταξα*, cocoon.

Type: *Mataxa elegans* sp. nov.

Shell of medium size and thickness; spire obtuse, its altitude less than half the entire length of the shell; protoconch large and smoothly polished, the earliest volutions for the most part submerged and increasing rapidly in size, thrice-coiled in the type-species; conch solid and slightly glazed, paucispiral, external sculpture subdued, axial sculpture subdued or absent; aperture broadly lenticular and produced anteriorly in a comparatively long recurved canal; outer lip expanded and dentate internally; parietal wall widely and heavily glazed; columella marked by two strong oblique plaits situated far in and behind two or more marginal plaits.

This genus is proposed for a species represented at Coon Creek by perfectly preserved elegant shells and a species *Narona eximia*,

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² The writer wishes to acknowledge his indebtedness to Prof. E. W. Berry and Dr. J. A. Gardner, of the Johns Hopkins University, under whose guidance this work was done; to Dr. W. H. Dall and Dr. T. W. Stanton, of the U. S. Geological Survey, and especially to Dr. L. W. Stephenson, of the latter organization, who has been engaged for several years in the areal, stratigraphic, and faunal studies of the Cretaceous of the Embayment region.

described and figured by Stoliczka³ in 1867 from South India and referred to the Cancellariidæ. It differs from *Cancellaria*, in general, by the development of a well-defined canal, by its lack of sharp and conspicuous cancellate sculpture, and further by its less acuminate spire. It differs from *Narona*, a subgenus of *Cancellaria*, in having a longer canal, a spire less acutely elevated, an anterior columellar plait more elevated than the posterior, instead of less so. Probably *Mataxa* is nearer the rare recent subgenus *Massyla*⁴ than any other form in the genus *Cancellaria*, but in this comparison, too, there are generic and time differences so great that it seems advisable to assign the Tennessee and South Indian forms to a new genus. *Mataxa* differs from *Massyla* in possessing a thicker, stouter and more solidly built shell; in having a comparatively long recurved canal, and further in nuclear characters. The protoconch of *Massyla* is trochoid, while in the nucleus of *Mataxa* the early volutions are for the most part submerged.

Mataxa elegans sp. nov. Pl. XXIII, figs. 1, 2, 3.

Description.—Shell of medium size, ovate in outline; spire less than half the entire length of the shell; whorls of conch three and a half in number; protoconch large, smooth and obtuse, thrice coiled, the first and second volutions for the most part immersed and coiled in a single plane, the final whorl of the protoconch moderately elevated, increasing rapidly in size; surface of conch slightly glazed and inconspicuously sculptured; axials reduced to fine incrementals and one or two exaggerated resting stages; spiral sculpture of low, broad, flattened bands, eight in number upon the penultima of the type, the two posterior the widest and separated from one another by a wide and rather deep sulcus; body spirals very obscure, increasingly so toward the aperture, more than 30 in number, interspaces wider than the spirals and very shallow, excepting directly in front of the suture; suture impressed; aperture more than half the entire length of the shell, lenticular in outline and produced anteriorly into a comparatively long canal; outer lip marked internally by 10 or 12 regularly spaced lirate denticles; columella reinforced with two rather strong oblique folds a little less than half way between the base of the body and the anterior extremity of the aperture and a less prominent marginal fold and occasionally a fourth feeble plication

³ Stoliczka, F., Cretaceous Fauna of South India, Geol. Surv. India, p. 166, Pl. XII, 1867.

⁴ Adams, H. and A., Genera of Recent Mollusca, 1855, vol. I, p. 278.

behind the margin; anterior fasciole rather short, moderately wide, emarginate at the extremity.

Dimensions.—Altitude, 23.4 mm.; maximum diameter, 13 mm.; spiral angle, 57°.

This form is well characterized by its somewhat buccinoid outline and rather low, obtuse spire, subdued spiral sculpture, the slightly flaring outer lip and plicate inner lip. This species is represented in the Coon Creek collection by two perfect specimens which are remarkable for shells as old as the Cretaceous on account of their state of preservation. The individuals possess a certain freshness of appearance and shell-color that remind one of recent gastropods lately recovered from the water.

Occurrence.—Ripley Formation: Dave Weeks Place, on Coon Creek, McNairy County, Tennessee.

Family **VOLUTIDÆ**.

Genus **TECTAPLICA** gen. nov.

Etymology: *tecta*, hidden; *plica*, fold.

Type: *Tectaplica simplica* sp. nov.

Shell of medium size, thick and strong; rudely biconic in outline; spire about one third the entire length of the shell; apex acute; protoconch broken away, scar small; whorls very much appressed; sculpture dominantly axial; aperture lanceolate, produced anteriorly into a slightly bent canal; outer lip simple; inner lip callous; parietal wall glazed; columella marked by three weak but well-defined folds, terminating far within the margin of the aperture.

This genus is well characterized by a thick, strong and simple shell which has a columella marked by feeble folds. It is one of the most primitive of the Volutes and may be considered as ancestrally related to *Volutilithes*. It differs from *Volutilithes* in having a less elongate spire, which is flattish on the sides and not interrupted by pronounced shoulders. *Volutilithes* is typically spinose and has an inner lip usually well excavated and marked by prominent folds, which extend well out on the inner lip.

Tectaplica simplica sp. nov. Pl. XXIII, fig. 4.

Description.—Shell of medium size, biconic in outline; spire acuminate, less than one third the entire length of the shell; whorls very closely appressed, six in number on conch; axial slopes flattish; protoconch broken away, scar small; external sculpture dominantly axial, consisting of ten prominent broadly rounded costæ increasing toward the aperture, crossed by very many faint spiral ridges,

summit of costæ unmarked by liræ; posterior fasciole indicated by the weakening of the axial sculpture; sutures inconspicuous, aperture lanceolate, produced anteriorly into a long canal; outer lip simple; inner lip callous and parietal wall glazed, callus concentrated just below the posterior commissure of the aperture; columella marked by three well-defined but feeble folds terminating within the aperture; posterior fasciole indicated by abrupt constriction of incrementals.

Dimensions.—Altitude, 35 mm.; maximum diameter, 13 mm.; spiral angle, $59^{\circ} 20'$.

This very simple, primitive Volute is represented in the present Coon Creek collection by a single individual. The folds of this form terminate so far within the aperture that it is necessary to section the spire in order to observe the columellar plaits.

Occurrence.—Ripley Formation: Dave Weeks Place, on Coon Creek, McNairy County, Tennessee.

Genus **DRILLUTA** gen. nov.

Etymology: A contraction of the generic terms *Drillia* and *Voluta*.

Type: *Drilluta communis* sp. nov.

Shell strong and fusiform; spire elevated; whorls numerous, increasing slowly in diameter; protoconch very small and smooth; sculpture dominantly axial, the costæ interrupted in front of the sutural line by a well-defined but rather narrow fasciole; aperture lenticular, produced anteriorly into a long, gently recurved canal; outer lip broadly arcuate, simple within; inner lip calloused; columella bearing one well-defined oblique fold, frequently with one or two minor folds behind it, all of which evanesce before reaching the aperture.

This genus includes a well-defined and widely distributed group of the Volutidæ, some of which are undescribed and some that have been described have been variously assigned to such genera as *Drillia*, *Voluta*, *Fasciolaria* and *Fusus*. *Drilluta* may be readily separated from *Drillia* by the absence of a posterior siphonal notch and further by the presence of columellar plaits on the Volute. The typical *Voluta* has a lower spire and numerous transverse folds. *Fasciolaria* has a more inflated body whorl and is not characterized by a well-defined posterior fasciole as is the case with *Drilluta*. *Fusus* on account of its smooth columella cannot be confused with *Drilluta*. There are two well-defined groups among the *Drillutæ*, so it seems advisable to separate this group into two sections.

Section A. New section.

Type: *Drilluta communis* sp. nov.

This section is characterized by shells of medium size with well rounded axials and a variable number of columella plaits which terminate within the aperture. The spiral sculpture is very fine on the spiral whorls and young individuals but well-defined on the anterior part of the body of adult individuals, and lacking on the posterior part of the older whorls of such individuals. This section is proposed to include besides the Coon Creek species the form "*Drillia ? distans*" Conrad⁵ from Owl Creek, a closely related species from Corsicana, Texas, and a poorly preserved specimen from Brightseat, Maryland. The descriptions and figures of *Voluta lativittata* Griepenkerl⁶ and *Voluta canalifera* (Favre) G. Müller⁷ indicate generic and sectional relations nearer to Section A of *Drilluta* than to any other forms that have been found in the literature.

Drilluta communis sp. nov. Pl. XXIII, figs. 5 and 6.

Description.—Shell of medium size and fusiform in outline; spire elevated, its altitude approximately one-half the entire length of the shell; apical angle higher on the posterior part of the spire, becoming slightly lower on the younger whorls; protoconch very smooth and trochoid, coiled about three times; whorls of conch closely appressed and eight in number; both axial and spiral sculpture developed, the former dominant, axial costæ rounded and abruptly elevated, 11 to 17 in number to the whorl, 14 on the penultima of the type, costæ flexuous, uniform in strength from the posterior fasciole to the anterior suture and a little less than half way down to the base of the body on the ultima; fasciole narrowed, indistinctly marked on the early whorls, defined in the later whorls by the abrupt disappearance of the axial costæ; spiral sculpture of fine crowded impressed lines on apical whorls, becoming faint and almost disappearing on the medial part of older whorls, but reappearing as coarse, impressed lines on slope of body whorl, becoming faint and disappearing on anterior fasciole; suture impressed; body whorl sloping down smoothly into a broad pillar; aperture lanceolate, produced anteriorly into a very feebly recurved canal; inner lip callous; outer lip simple; columella marked by one well-defined fold and one or two weaker posterior

⁵ Conrad, T. A., *Jour. Acad. Nat. Sci.*, Philadelphia, 2d ser., vol. IV, p. 286, pl. 46, fig. 49, 1860.

⁶ Griepenkerl, O., 1889, *Palaeontologische Abhandl.*, Band IV, Heft 5, p. 93 (395), Taf. viii, fig. 1, 1889.

⁷ Müller, G., 1899, *Abhandl. d. Kön. Preus.-geol. Landesanstalt*, neue Folge, Heft 25, p. 124, Taf. xvi, figs. 13, 14.

folds, all of which evanesce before reaching the aperture, plications invisible in the aperture.

Dimensions.—Altitude, 62 mm.; length of aperture, 31 mm.; maximum diameter, 20 mm.; spiral angle, 40° on posterior whorls, decreasing to 25° on anterior whorls.

This species is one of the most abundant and best preserved univalves at Coon Creek. It shows a considerable range in size and external ornamentation. Some of the young individuals exhibit a fine spiral sculpture over the entire length of the shell. The number of columellar plaits is variable. These terminate far within the body whorl, distant from the margin of the aperture, and in many individuals are almost entirely obscured, although they are readily revealed by sectioning the spire. A comparison of this form with two other members of the section of the genus, one from Owl Creek, the type locality of "*Drillia ? distans*" Conrad and the other from Corsicana, Texas, indicates that the Coon Creek species is intermediate between those cited.

Occurrence.—Ripley Formation: Dave Weeks Place, on Coon Creek, McNairy County, Tennessee.

Section B. New section.

Type: *Drilluta major* sp. nov.

This section is characterized by a large, much elevated and elaborately sculptured shell. The whorls are abruptly shouldered. The posterior shoulder is marked by spinous regularly spaced varix-like projections. It is proposed for a well-defined group of *Drilluta* which include, besides the Coon Creek species, a species from Owl Creek and another from Brightseat, Maryland, which has been questionably referred to *Fasciolaria*⁸ on account of the imperfect character of the material. The description and figures of *Voluta magnifica* Griepenkerl⁹ and *Voluta* (*Volutilithes*) *subsemiplicata* (d'Orbigny) G. Müller¹⁰ present generic and sectional relations which suggest this section of *Drilluta*.

Drilluta major sp. nov. Pl. XXIII, figs. 7 and 8.

Description.—Shell thick and large, fusoid in outline; whorls closely appressed, seven in number and increasing slowly in size; apex

⁸ Gardner, J. A., Md. Geol. Surv., 1916, Cretaceous, Upper, p. 438, pl. xiv, fig. 11.

⁹ Griepenkerl, O., 1889, *Palaeontologische Abhandl.*, Berlin, Band IV, Heft 5, p. 94 (396), Taf. viii, fig. 2.

¹⁰ Müller, G., 1899, *Abhandl. d. Kön. Preus. geol. Landesanstalt*, neue Folge, Heft 25, p. 123, Taf. xvi, figs. 10–18–21.

acute, broken away, but protoconch as indicated by the scar probably very small; whorls of spire slightly flattened dorso-ventrally, constricted posteriorly, ultima merging smoothly into a wide pillar; external ornamentation quite coarse and elaborate; axial sculpture of rounded quite strongly elevated costæ waving backward along the shoulder, 11 to 14 to the volution, costæ becoming shorter and less prominent on approaching the aperture, on young whorls costæ reach from posterior fasciole to anterior suture, but become shorter anteriorly and occur only along the shoulder of the whorl; posterior part of whorl constricted and marked by a narrow posterior fasciole set with closely spaced spinose, varix-like processes, most of these processes broken away in type; spiral sculpture absent on first three apical whorls, becoming more prominent anteriorly until conspicuous on body whorl; more than thirty strongly elevated spirals on body whorl, spirals more widely spaced on medial portion of body whorl; spirals along medial portion of body somewhat arcuate on type with most gentle slope anteriorly; body whorl sloping gently into a broad pillar; aperture lenticular and produced anteriorly into a canal; inner lip calloused, parietal wall thinly washed; fold in front of one or two less prominent folds, all of which become obsolete before reaching the opening of the aperture.

Dimensions.—Imperfect specimen: Altitude, 85 mm.; maximum diameter, 32 mm.; spiral angle, 30°.

This magnificent species is represented in the present collection from Coon Creek by two individuals, both of which, while imperfect, yet show the essential characters of the shell. It is well characterized by the elaborate axial and spiral ornamentation, the very acuminate spire and further by the spinose varix-bearing posterior fasciole.

Occurrence.—Ripley Formation: Dave Weeks Place, on Coon Creek, McNairy County, Tennessee.

Family **FUSIDÆ**.

Genus **FUSUS** Lamarek.

Subgenus **ANOMALOFUSUS** subgen. nov.

Etymology: ἀνώματος, irregular; *fusus*, a gastropod.

Type: *Fusus* (*Anomalofusus*) *substriatus* sp. nov.

Shell of medium size and elongate, fusiform in outline; spire acuminate and of approximately the same length as the aperture; protoconch naticoid and smooth, coiled about three times; axials most prominent ornamentation, costæ irregular in size and spacing; spiral sculpture consisting of many fine elevated liræ of different

sizes which override axials; suture impressed, aperture lenticular and produced anteriorly into a canal; outer lip thickened and dentate within, broadly notched between suture and medial part of outer margin of aperture; inner lip thinly calloused, columella smooth and slightly sinuous.

The nuclear characters, the sharp cancellate sculpture, and immediately thickened outer lip which is broadly notched in front of the suture seem to assign this form to the rank of a subgenus under *Fusus*. This form bears some resemblance to *Phos* in general outline, but is much more slender. *Phos* is characterized by a columella which is much more sharply twisted. *Anomalofusus* has a longer canal than any of the Buccinidæ and lacks the abruptly excavated columella, plicate in front, which is characteristic of *Phos*. Besides nuclear characters, *Anomalofusus* differs from *Fusus* in its shorter canal, and further by its thickened and notched outer lip.

***Fusus (Anomalofusus) substriatus* sp. nov.** Pl. XXIII, figs. 9, 10, 11.

Description.—Shell of medium size and elongate, fusiform in outline; spire acuminate and of approximately the same length as the aperture; whorls roundly shouldered, three to five in number on conch; protoconch naticoid and smooth, coiled about three times; external sculpture elaborate, axials predominating, costæ well rounded and elevated, irregular in size and spacing, reaching from anterior to posterior suture on spiral whorls, but evanescent on anterior part of body; spiral sculpture consisting of about 14 small primary elevated liræ and in each interspace there are from one to three very fine primary liræ, primary liræ lacking on a narrow band just in front of suture, both primary and secondary liræ override costæ; suture impressed; aperture lenticular and produced anteriorly into a canal; outer lip thickened and dentate within, broadly notched between suture and medial part of outer margin of aperture; inner lip calloused; columella smooth and slightly sinuous.

Dimensions.—Immature individual: Altitude, 17.5 mm.; length of aperture, 9.5 mm.; maximum diameter, 7.5 mm.; spiral angle, 35°.

This elegantly sculptured gastropod is abundant at Coon Creek. There is a wide range in the maturity of individuals, some have only one whorl of the conch, while the older ones have five whorls. The protoconch is preserved and conspicuous on most specimens.

Occurrence.—Ripley Formation: Dave Weeks Place, on Coon Creek, McNairy County, Tennessee.

Genus **ORNOPSIS** gen. nov.

Etymology: *ορνις*, bird; *ὄψις*, form.

Type: *Ornopsis glenni* sp. nov.

Shell fairly large and strong; body whorl inflated; spire varying in relative altitude; protoconch very small, smooth, paucispiral, and trochoid; both axial and spiral sculpture well developed; aperture pyriform, abruptly constricted, and sinistrally inclined; outer lip marginally crenate; parietal wall washed by a callus; columella marked by a strong laterally compressed laminar plait situated at the entrance of the anterior canal.

This genus is characterized by a peculiar narrow flexed canal and a sharp laminar plait on the columella directly behind the entrance of the anterior canal. In these respects it differs from the other Fusidæ. In general outline *Ornopsis elevata* greatly resembles the genus *Latirus*, but differs from it in the character of the anterior canal. *Odontofusus* of the Fascioliariidæ has a more elevated spire, a more feeble columella fold and a nearly straight anterior canal. The close, compact spire of *Ornopsis* resembles some of the Buccinidæ, but here again the apertural features are distinctly different.

Ornopsis glenni sp. nov. Pl. XXIV, fig. 1.

Description.—Shell fairly large and strong; elevation of spire less than length of aperture; protoconch very small, smooth, paucispiral and trochoid; volutions of conch six in number, increasing in size from a very small apical whorl to an inflated body whorl; external ornamentation well-defined, axials elevated, well rounded and short, beginning at shoulder and quickly evanescent in front of the periphery of body, becoming less prominent toward aperture and disappearing almost entirely in some individuals, costæ of varying size and spacing, twelve on body of type; spiral lines sharply impressed, more than thirty on body whorl, becoming fine and oblique on pillar; shoulder broad, feebly convex; suture impressed; body whorl abruptly constricted into a slender pillar; aperture pyriform, produced anteriorly into a narrow canal sinistrally inclined; outer lip sharp and marginally crenate; parietal wall washed with a callus thickest at posterior extremity of aperture; columella flattened at the entrance of the canal into a shelf-like fold.

Dimensions.—Altitude, 48 mm.; length of aperture and canal, 33 mm.; maximum diameter, 24 mm.; spiral angle, 60°.

This form is well characterized by its pointed apex, much inflated body and further by the flattened shelf-like fold. It is one of the most abundant gastropods at Coon Creek, being represented in the

collection by many perfect specimens. It is the type of the genus and is named in honor of Dr. L. C. Glenn, Professor of Geology at Vanderbilt University.

Occurrence.—Ripley Formation: Dave Weeks Place, on Coon Creek, McNairy County, Tennessee.

Ornopsis elevata sp. nov. Pl. XXIV, figs. 2 and 3.

Description.—Shell of medium size, rugose; spire elevated, its altitude approximately the same as the length of the aperture; protoconch broken away; external sculpture dominantly axial, the costæ elevated and rounded, highest upon the shoulder, becoming faint toward the anterior, evanescent anteriorly and absent altogether upon the posterior fasciole, about twelve on body whorl, irregularly spaced toward aperture; space between shoulder and posterior suture separated by slightly narrower concave intercostals; spiral sculpture of rather low, crowded liræ separated by deeply impressed lines, about twenty on body whorl; liræ equally as well marked on the summit of the axials as in intercostal spaces; suture line impressed; body whorl smoothly constricted anteriorly into a narrow pillar, posterior part of aperture ovate, but broken anteriorly by a rather long narrow anterior canal; inner lip calloused; columella flattened at the entrance of the canal into a flat shelf-like fold.

Dimensions.—Altitude, 34.5 mm.; maximum diameter, 17.2 mm.; spiral angle, $44^{\circ} 51'$.

This species differs from *Ornopsis glenni* in possessing a higher, more acuminate spire and a less inflated body whorl.

Occurrence.—Ripley Formation: Dave Weeks Place, on Coon Creek, McNairy County, Tennessee.

Family **BUCCINIDÆ**.

Genus **HYDROTRIBULUS** gen. nov.

Etymology: ὕδωρ, water; τριβόλος, burr.

Type: *Hydrotribulus nodosus* sp. nov.

Shell moderately large and solid, top shaped in outline; spire less than half the entire length of the shell; protoconch scar small, sculpture vigorous, the axials undulatory, the spirals more sharply defined; aperture pyriform and produced anteriorly into a narrow recurved canal; outer lip expanded and abruptly constricted at the base of the body, dentate within; parietal wall heavily glazed, sometimes bearing a tooth-like process directly in front of the posterior commissure; inner lip excavated and calloused, reflected anteriorly, con-

cealing entirely the umbilicus; edge of pillar flattened at entrance of canal, simulating a fold.

This genus is characterized by a fairly low-spiral angle; vigorous rugose, cancellate sculpture; a much inflated body and further by a much excavated and reflected inner lip, which conceals an umbilicus. Besides the Coon Creek species it is represented by an undescribed species from Owl Creek, Mississippi, and another from Brightseat, Maryland, and further by a species in the Senonian of Aix-la-Chapelle, Germany. The German species was first described by Müller in 1851 and assigned to the genus *Rapa*. Since then it has been variously assigned by other palæontologists to such genera as *Fusus*, *Pyrella*, *Hemifusus*, *Pyropsis* and finally to *Tudicla* by Holzapfel,¹¹ who discussed the species in 1888. A study of the description and figures of the German form, together with the Coon Creek species and specimens from the Maryland and Mississippi localities, indicates that these species belong to a well-defined group, and it seems advisable to propose for their reception a new genus *Hydrotribulus* of the family Buccinidæ. In general aspect this genus resembles *Pyrifusus*, but differs from it in having a shorter recurved anterior canal and a pillar which is flattened and recurved in a unique manner at the entrance of the canal. *Tudicla* has a much flatter spire, a more globose body and a much more abruptly constricted, longer and straighter canal. It differs from *Strepsidura* in characters of the anterior canal and aperture and further by its characteristic rugose cancellate sculpture.

Hydrotribulus nodosus sp. nov. Pl. XXIV, figs. 4 and 5.

Description.—Shell fairly large and very heavy with a rugosely cancellate sculpture; top-shaped in outline; spire rather low; its altitude less than the length of the aperture, sides converging at an angle of 70 degrees; whorls of conch five in number and rapidly increasing in size to a much inflated body; whorls of conch obliquely shouldered, the peripheral angle of the spire falling in front of the medial horizontal; sculpture vigorous, both axial and spiral, restricted almost entirely to the area in front of the periphery; axials elevated and broadly rounded, sixteen in number on the body whorl of the type, subequal in size and regularly spaced; spiral sculpture of broad, elevated fillets, most prominent on the body; subnodose at the intersections of the axials which they override,

¹¹ Holzapfel, E., *Palæontographica*, Band XXXIV, p. 106, Taf. xi, figs. 4-7, 1888.

two in number on the whorls of the spire and four on the medial portion of the ultima, separated by shallow channels of approximately the same width as the fillets; shoulder sloping at an angle of about 45° , very feebly convex; sculpture with retractive undulations corresponding in number and proportion to the axials with an obscure secondary liration and revolving a little behind the periphery; base of body and pillar threaded with flattened spirals which become increasingly narrow anteriorly; suture quite deeply channeled, undulated in harmony with the preceding volution, body whorl constricted rather abruptly into a broad pillar; aperture pyriform, produced anteriorly into a narrow canal; outer lip broadly expanded; crenulated at the margin and feebly cordate within, the cords restricted to the margin and corresponding in position with the interspiral areas; inner lip broadly concave, non-plicate; parietal wall heavily glazed and bearing an obscure tooth directly in front of the posterior commissure; edge of pillar flattened at the entrance of the canal simulating a fold, canal sharply recurved, moderately long and narrow with parallel proximate margins; umbilicus closed by the reflected inner wall of the aperture but indicated by a depression between the callus and the anterior fasciole.

Dimensions.—Altitude, 44 mm.; length of aperture and canal, 28 mm.; maximum diameter, 32.4 mm.; spiral angle, 70° .

This elegant species is represented in the Coon Creek collection by perfectly preserved specimens. The species is characterized by the obliquely shouldered whorls, the prominent subnodose intersections of the banded spirals and the undulatory axials, further by the low spiral angle and outline of cross-section of body.

Occurrence.—Ripley Formation: Dave Weeks Place, on Coon Creek, McNairy County, Tennessee.

Family **EUOMPHALIDÆ**.

Genus **HIPPOCAMPOIDES** gen. nov.

Etymology: *ἵπποχαμπος*, sea-horse; *εἶδος*, shape.

Type: *Hippocampoides serratus* sp. nov.

Shell rather small, flattened or feeble apically; widely and deeply umbilicate; protoconch minute, planaroid, paucispiral; whorls of conch relatively few, increasing rapidly both in diameter and altitude toward the aperture; external surface usually smooth; peripheral margin acutely angulated, often sharply serrate; aperture holostomous, umbilicus funicular, the outer margin acute, conspicuously produced anteriorly.

This flattened form is assigned to the family Euomphalidæ because of its flat spire, its deep wide umbilicus, the outer margin of which is produced conspicuously and further on account of the angular peripheral margin. *Hippocampoides* resembles *Discohelix* somewhat, but differs from it in having a protoconch not inverted and further in not having a whorl with a quadrate cross-section. It may be separated from *Straparollus* by the height of the spire and cross-section of body whorl.

Hippocampoides serratus sp. nov. Pl. XXIV, figs. 11, 12, 13.

Description.—Shell rather small, flattened or very feebly convex, apically concave laterally, the altitude increasing toward the aperture, profoundly umbilicate; protoconch minute, planaroid depressed below the plane of the initial whorl of the conch, the one and one-half component volutions rather loosely coiled and approximately uniform in diameter, line of demarkation between conch and proconch indicated by a slight but very abrupt increase in the diameter of the whorl; conch thrice coiled, the whorls increasing regularly and quite rapidly in diameter; external surface smooth and probably polished in the original state; peripheral keel acute, sharply and, on the final half turn, profusely serrate; the indentation nearest the aperture running almost half way to the suture line; the deepest of the serrations coincident with pronounced resting stages so the last half turn seems to be made up of a series of overlapping triangular plates; suture line rather deeply impressed; aperture semi-elliptical in outline, the aperture half again as great as that of the body whorl at its initiation, but less than half that of the body whorl at its close; peristome adnate along the body wall, very feebly emarginate both at the peripheral and at the umbilical keels; approximately straight between the notches, umbilicus very wide, profound, persistent to the apex, funicular, the outer margin acute, probably serrated; area between the peripheral and umbilical keels quite symmetrically concave.

Dimensions.—Altitude, 11 mm.; length of aperture, 5 mm.; maximum diameter, 19.2 mm.

This species is remarkable for the auriculate outline of the apical aspect, the deep serrations of the periphery, the rapid increase of the altitude of the shell toward the aperture, the lateral concavity and the profound umbilicus, approximately half as wide as the entire shell and margined by an acutely angulated keel. The edge of the keel has been macerated, but there is evidence that it was quite strongly serrate.

Occurrence.—Ripley Formation: Dave Weeks Place, on Coon Creek, McNairy County, Tennessee.

Family **TURBINIDÆ**.

Genus **SCHIZOBASIS** gen. nov.

Etymology: *σχίζειν*, to split; *βάσις*, base.

Type: *Schizobasis depressa* sp. nov.

Shell of medium size, thick, porcellaneous, depressed and globose, very low and smoothly rounded; protoconch lost in type species; conch paucispiral, the component whorls increasing regularly and rapidly in diameter; sculpture coarse and dominantly spiral; sutures obscure; aperture circular, interrupted posteriorly by a slight shallow siphonal notch and anteriorly by a slit which marks the entrance of the anterior canal; outer lip not thickened, simple within; inner lip excavated, heavily reinforced; anterior canal rather short with the parallel proximate margins distorted so that it appears as a narrow slit cutting across the base of the shell directly at right angles with the axis; callus almost filling the umbilicus; umbilicus imperforate, the umbilical region spread out in a trigonal area and flattened against base of the columella, from which it is separated by a profound sulcus; depressed umbilical keel marked by growth stages or often poorly defined varices.

This genus is characterized by depressed spire and by a peculiar anterior canal which is short and deep and at right angles to the axis of the shell and resembling a slit in the anterior part of the aperture. It does not seem to be near anything heretofore described, and it has been assigned to the family Turbinidæ only after some hesitation. The Turbinidæ have a much depressed shell and sculptural and nuclear characters much like *Schizobasis*, but none of that family possess the short, well-defined canal which characterized this new genus. The recent *Turbo cornutus*, which is common in the Indo-Pacific, has a very shallow anterior canal. The genus *Sargana* of the Thaisidæ has a much depressed spire, a shallow, posterior notch and a narrow anterior canal inclosed in an umbilical keel which is varicose and altogether possesses points analogous to *Schizobasis*. *Sargana* has an entirely different sculpture and a much produced anterior canal which are family characters, probably great enough to bar *Schizobasis* from the Thaisidæ. *Turbo* differs from *Schizobasis* in being nacreous and in having no well-defined canal. There is an undescribed species of *Schizobasis* that occurs at Eufaula, Alabama.

Schizobasis depressa sp. nov. Pl. XXIV, figs. 8, 9, 10.

Description.—Shell of medium size, thick, porcellanous, depressed and globose, spire very low and smoothly rounded, rising slightly above the body whorl; protoconch broken away in type species; conch paucispiral, the component whorls three and one half in number, increasing regularly and rapidly in diameter, outer wall of one and one-half whorls of the apex broken away from spire of type; sculpture coarse and dominantly spiral, seven low, round spirals on body whorl, evanescent rather suddenly on body near aperture of adult, posterior spiral less rounded and very near posterior suture, obscuring suture line, interspiral spaces much narrower than spirals; a deep spiral sulcus at base of body between anterior spiral and umbilical keel; spiral sculpture consists of irregularly occurring unequal costæ shown on top of spirals and absent in interspiral spaces; costæ receding anteriorly, parallel to outer margin of aperture, aperture circular, interrupted posteriorly by a slight shallow siphonal notch and anteriorly by a slit which marks the entrance of the anterior canal; outer lip simple; inner lip excavated, heavily reinforced; anterior canal rather short with parallel proximate margins distorted so that it appears as a narrow slit cutting across the base of the shell directly at right angles with the axis; callus almost filling the umbilicus; umbilical keel showing two poorly defined varices; umbilical region spread out in a trigonal area and flattened against the base of the columella.

Dimensions.—Elevation, 18.4 mm.; maximum diameter, 23.3 mm.; spiral angle, $125^{\circ} 40'$.

The type of this very interesting genus is represented in the Coon Creek collection by a single perfectly preserved specimen.

Occurrence.—Ripley Formation: Dave Weeks Place, on Coon Creek, McNairy County, Tennessee.

Family **DELPHINULIDÆ**.

Genus **URCEOLABRUM** gen. nov.

Etymology: *urceus*, jug; *labrum*, lip.

Type: *Urceolabrum tuberculatum* sp. nov.

Shell small and porcellanous; trochoid in outline with a conspicuous aperture; apex acute, protoconch broken away in type species, but scar small; sculpture cancellate, often tubercular at the intersection of spirals and axials; suture impressed; aperture circular and much thickened around the rim, umbilicus wide and deep.

This genus is proposed for a well-defined group of forms which are

characterized by a conspicuous circular reinforced aperture, a profound umbilicus, and an elevated cancellate spire. Besides the Coon Creek species two others are known, an undescribed species from Eufaula, Alabama, and a species described by Müller in 1851 from Aachen beds of Vaals, Germany, and referred to the genus *Scalaria*. The same species was referred to *Liotia* by Holzapfel in 1888.¹² This genus differs from typical *Liotia* which occur in the Coon Creek strata in having a more elevated spire, a circular reinforced aperture and further by a profound umbilicus. In general outline there is some resemblance to *Delphinula*, but *Delphinula* has a nacreous interior and an aperture which is not reinforced or circular.

Ureolabrum tuberculatum sp. nov. Pl. XXIV, figs. 6 and 7.

Description.—Shell small, solid, porcellanous and ornately sculptured; spire elevated and acute; protoconch scar small; whorls circular in cross-section and four in number; external ornamentation elaborate, axials dominant, costæ 14 in number on penult equally spaced and evanescent on base of the body; spirals forming 5 rows of tubercles at intersection with costæ on body whorl, interspiral space at base of body rather wide, an isolated row of tubercles on anterior margin of the umbilicus; suture impressed and crenate; aperture circular, peristome heavily reinforced and calloused resembling mouth of a jug, rim of aperture half as wide as opening; umbilicus profound and funicular.

Dimensions.—Altitude, 5 mm.; width of aperture, 1 mm.; maximum diameter of body, 3.4 mm.; apical angle, 60°.

This elegant little species is hard and well preserved, being rather common in the Coon Creek sediments. It may be separated from the Eufaula species by the fact that the Eufaula form has fine secondary liræ between the primary spirals and on the band at the base of the body whorl. It differs from the German species of this genus¹³ in having sharper axials and tubercles at intersection of costæ and spirals; the German form has radial lines on the reinforced aperture, while aperture of the Tennessee form is smooth.

Occurrence.—Ripley Formation: Dave Weeks Place, on Coon Creek, McNairy County, Tennessee.

¹² Holzapfel, E., 1888, *Palaeontographica*, Band XXXIV, p. 170, Taf. xviii, figs. 3-7.

¹³ Holzapfel, E., 1888, *loc. cit.*

EXPLANATION OF PLATES XXIII AND XXIV.

PLATE XXIII.—Fig. 1.—*Mataxa elegans* gen. et sp. nov. Rear view. $\times 2$.

Fig. 2.—Same. Apertural view. $\times 2$.

Fig. 3.—Same. Apical view. $\times 10$.

Fig. 4.—*Tectaplica simplica* gen. et sp. nov. Apertural view. Nat. size.

Fig. 5.—*Drillula communis* gen. et sp. nov. Apertural view. Nat. size.

Fig. 6.—Same. Rear view. Nat. size.

Fig. 7.—*Drillula major* gen. et sp. nov. Rear view. Nat. size.

Fig. 8.—Same. Apertural view. Nat. size.

Fig. 9.—*Fusus substriatus* sp. nov. Apertural view. $\times 2$.

Fig. 10.—Same. Rear view. $\times 1\frac{1}{2}$.

Fig. 11.—Same. Apical view. $\times 10$.

PLATE XXIV.—Fig. 1.—*Ornopsis glenni* gen. et sp. nov. Apertural view. Nat. size.

Fig. 2.—*Ornopsis elevata* gen. et sp. nov. Apertural view. $\times 1\frac{1}{2}$.

Fig. 3.—Same. Rear view. $\times 1\frac{1}{2}$.

Fig. 4.—*Hydrotribulus nodosus* gen. et sp. nov. Apertural view. Nat. size.

Fig. 5.—Same. Rear view. Nat. size.

Fig. 6.—*Urceolabrum tuberculatum* gen. et sp. nov. Apertural view. $\times 6$.

Fig. 7.—Same. Rear view. $\times 6$.

Fig. 8.—*Schizobasis depressa* gen. et sp. nov. Rear view. Nat. size.

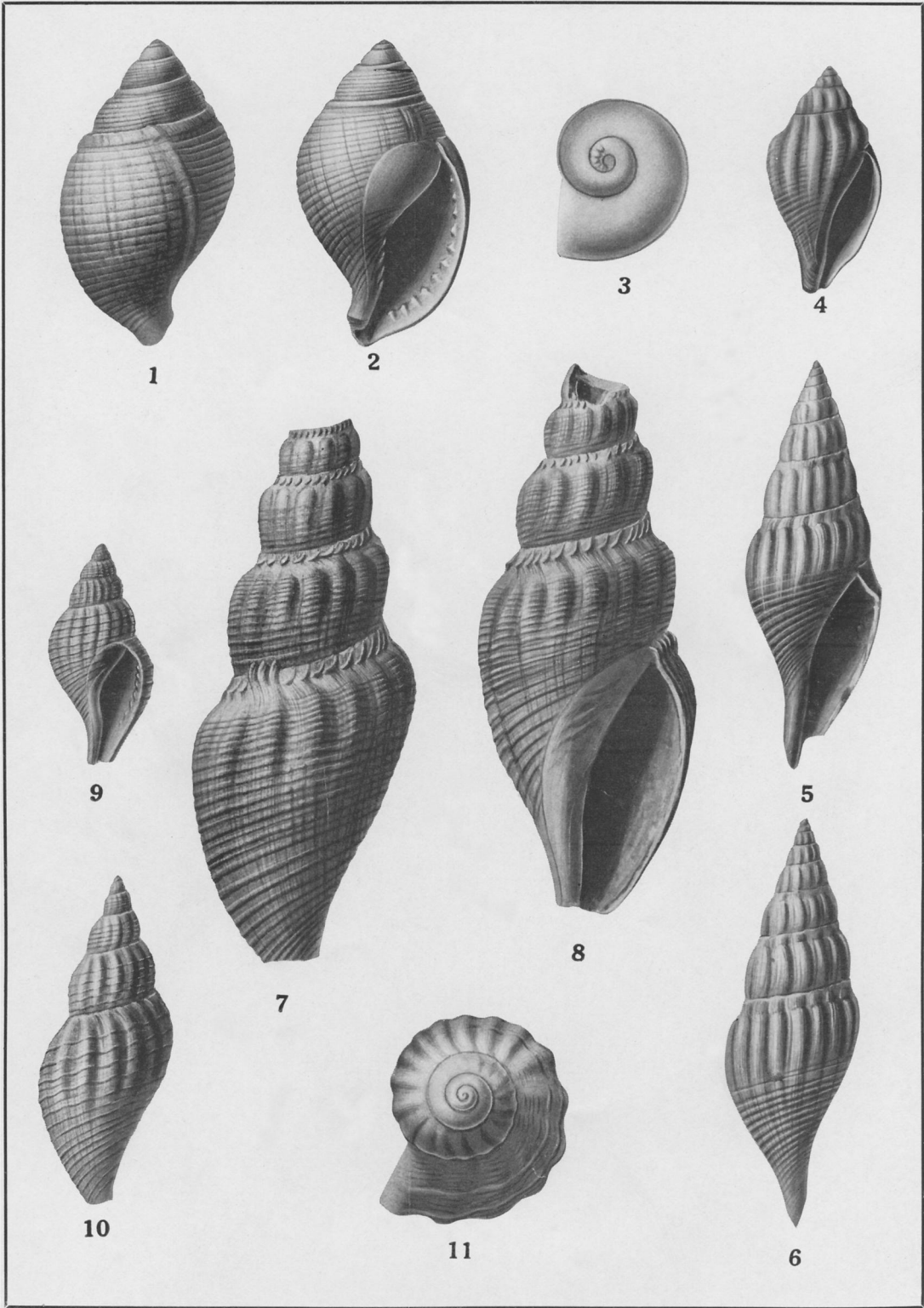
Fig. 9.—Same. Apertural view. Nat. size.

Fig. 10.—Same. Basal view. Nat. size.

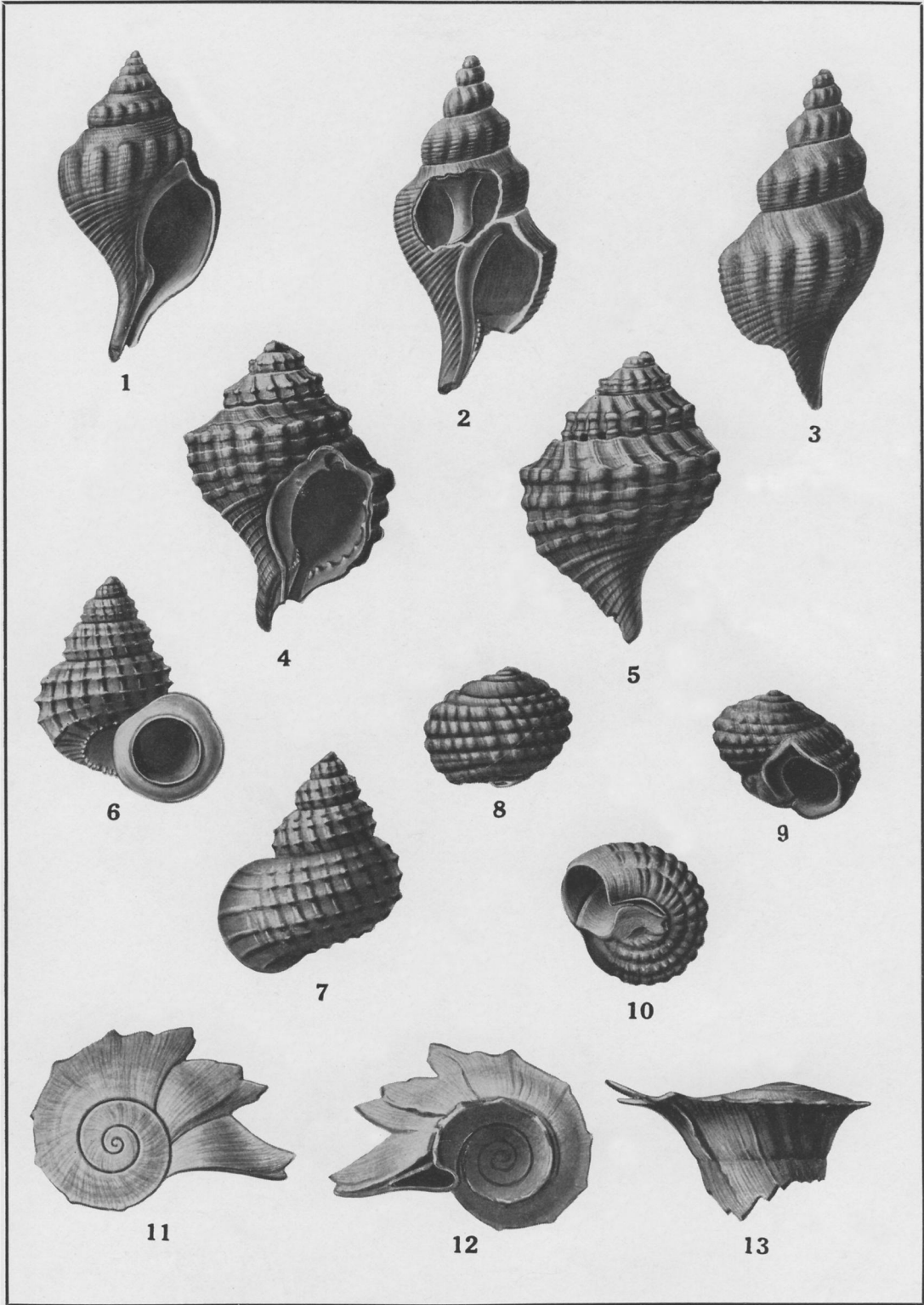
Fig. 11.—*Hippocampoides serratus* gen. et sp. nov. Apical view. $\times 2$.

Fig. 12. Same. Basal view. $\times 2$.

Fig. 13.—Same. Lateral view. $\times 2$.



WADE: NEW CRETACEOUS GASTROPODA.



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